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ESSAY

ON

The effects of drinking cold water when the system is heated

BY

George Augustus Sykes

AN

Inaugural Dissertation,

ON

The effects of drinking cold water when the system is heated;

Submitted

To the examination of the

Revd. Frederick Beasley, D.D. Provost;

The Trustees,

and Medical Faculty of the University of Pennsylvania;

FOR

The degree of Doctor of Medicine.

BY

George Augustus Sykes.

OF VIRGINIA.

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The mortality arising from drinking cold water in our summer months has been so alarming as to render it highly necessary that every one who engages in the practice of medicine should be familiar both with the nature of the disease and mode of cure — It is on this account that I have selected it as a subject for an inaugural dissertation; not, however, as might be presumed to give, but to elicit information. —

This cause occupies a station amongst the outlets of the human family, to which they have ever been liable from the creation of man to the present time; and doubtless during this long period, innumerable cases have occurred, yet in looking over the records of medicine we are surprised to see how little has been written on this when compared with other diseases of far less consequence. — A remarka-

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ble example of the ravages of its effects is related by the historian to have occurred to the army of Alexander the Great in pursuit of Bessus through the desart of Sogdiana; a greater number of his troops were destroyed on arriving at the River Oxus by drinking plentifully of water, than in any of his battles. "Sed qui intemperantius hauserant interclusso spiritu exterriti sunt; multique major hominum numerus fuit, quam ullo amiserat proelio." Quint. Curs. lib. VII. cap. 5. — History affords us other examples; a similar one is related by Appian — "Appianus Alexandrinus de bellis civilibus, lib. 5. tradidit Caesarianos milites a Pompeianis pugna fatigatos et aestuantes fontanam aquam avide biberites, ex iis plurimos exanimatos." — Another disaster of the kind befell the Christian army in the holy wars. Gulielmus Tyrius, lib. iii. cap. 16. scribit, "Christianum agmen Pieriam, ingressum, regionem

arentem et inaquosam, tandem invenit fluvio, avide bibisse; quod quidem, qui largius aquam frigidam ingurgitaverunt, sitis discrimen evadentes, mortem in aquarum opulentia reperere! — Such extensive destruction from drinking cold water as the above instances, does not frequently occur, nevertheless, solitary cases of it are by no means uncommon, and are sufficient inducements to lead us into an enquiry after the disease. — It appears that the disorder does not so frequently occur in England as in this Country. Dr. Cursie in his Medical reports observes that in his experience this sudden death has occurred once only — It was the case of a young man who had been engaged a long time in a most severe match at fives. After it was over, he sat down on the ground panting for breath, and covered with profuse perspiration.

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In this state he called to a servant to bring him a pitcher of cold water just drawn from a pump in sight. He held it in his hands for some minutes, but put it to his mouth as soon as he had recovered his breath, and drank a large quantity at once. He laid his hands on his stomach, and bent forwards; his countenance became pale, his breath laborious, and in a few minutes he expired. Cursie has recorded several others — one of which is taken from Sealager. It was that of a reaper, who stooping down to drink after severe labour, instantly expired. — The morbid effects caused by drinking cold fluids are not wholy restricted to water. The late Dr. Rush has stated that punch, beer, and even toddy, when drunken under the same circumstances as cold water, have been known to produce the same morbid and fatal effects. Benevenius records a case which was caused by drinking wine — Blasius, Senensis, familiaris mo-

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ter et condicipulus, dum longiusculo tempore sub ardentissimo sole pila lusu insudavisset, nec sudore adhuc aut fatigatione sensisset, in subterraneum locum ubi vinaria erat cellula, descendisset, frigidissimi vini calicem hausit; quo sito, statim defecit.' – It was induced in some persons this summer (1825) by drinking cold milk. –

It was remarked by Dr. Rush that it seldom occurred unless the thermometer stood above 85° Fahrenheit; this is most usually correct, but it sometimes occurs several degrees below that temperature. The 14th. of July afforded an example of it in this city (Philadelphia). In the morning at 6 o'clock the thermometer stood at 79° F. at 12 M. 81°, and at 3 P.M. 82 F. On that day several deaths from drinking cold water took place. – The labouring Irish, who are but too frequently the subjects of intemperance & rashness, are peculiarly liable to be affec-

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ted by it, yet, however, it occasionally attacks all ranks and conditions. — 'Three circumstances', observes Dr. Rush, 'generally concur to produce disease or death from drinking cold water. 1. The patient is extremely warm. 2. The water is extremely cold. And 3. A large quantity of it is suddenly taken into the body. The danger of drinking cold water is always in proportion to the degrees of combination which occur in the three circumstances that have been mentioned.' It is evident from this that he apprehends the danger to arise from the great difference between the temperature of the body, and of the water taken in. — Currie on the other hand asserts 'that there is no situation in which the application of cold to the body, ~~whether to the~~ surface or the stomach, is so safe, or in general so salutary, as when the heat of the body from whatever cause, is preternaturally great, provided that the

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body is not already in a state in which it is rapidly parting with its heat, and no disease has taken place either in the general sensibility or in the structure of any of the parts?— There is great clashing of opinions between two eminent characters, and we would naturally suppose, from the instinctive desire which pervades all human nature to reconcile contrary opinions, that this would have been attempted before this time; yet such, I believe, is not the case. It would be deemed presumption or folly in one of my inexperience and age to attempt to reconcile this discordance; if, however, I may be allowed to exercise my humble opinion, I would beg leave to dissent in some points from each of their views. To the opinion 'that the water must be 'extremely cold,' I can not subscribe because I have heard of cases wherein the water was not extremely cold, and we may reasonably suppose

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from the temperature of the climate in which the Jews flowed, that the water thereof could not have been very cold — yet very destructive to the soldiers of Alexander. — I can not agree to Dr. Currie's assertion that when the preternatural heat, no matter how great, provided it is not diminishing, will admit of drinking cold water with ~~out~~ impunity. Those who have had much experience in this disease can bear testimony against it. If the doctrine taught by him was to be received as true, the extent of the injury sustained by such a belief, would, I fear, be greater than has been hitherto under the ordinary belief — I presume sad experience would soon teach them better. —
It has become a question whether the same or similar effects may not be produced by the internal application of cold water? Dr. Currie thinks they may, and that the only difference between their operation, if any exist, consists

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of the oppression from the weight and bulk of the water which the stomach sustains when internally taken under the constant agitation of the muscles; whereas when externally applied, the patient is devoid of the oppression, but encounters a greater degree of cold from the evaporation which is carried on externally from the surface. Be this the only difference as to their operation, or not, cases of the disease have been produced by its external application. One of the most remarkable of these befell Alexander the Great in one of his heroic conquests attended with great exertion and fatigue, covered with dust and sweat, he plunged into the waters of the pure and cold Cydnus, at the city of Tarsus, and well nigh terminated his earthly career. The following is the description of the disease given by Quintus Curtius lib. iii. cap. 5. 'Vicque ingressi subito horror artus rigere coepernunt;

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pallor deinde suffusus est, et totum propemodum corpus vitalis deliquit. Exspirantis similem ministri manus excipiunt, nec satis compotem mentis in tabernaculum deferunt'. A case of its external application producing effects similar to those when internally taken, fell under the observation of a distinguished practitioner of this city. It was that of a female who had been engaged for some time in washing cloths in warm water during one of the warmest days of this summer; immediately after finishing them in this, she commenced rinsing them out in hydrant water, which, though not very cold, was several degrees below the temperature of that she had just left; in a very short time after this, she was seized with symptoms similar to those arising from drinking cold water, although she had drank none — she was successfully treated as if she had drank of it. It may be

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well to observe that this female had been subject to chronic intermittent fever, and might thus be considered as predisposed to internal congestion. — Cases like the above tend to call in question the correctness of Dr. Rush's prophylactics, and moreover induce us to believe they may even produce the disease themselves. Such unhappy effects are not always caused by sudden transitions from heat to cold water. The Roman youth were formerly accustomed to use the greatest degrees of exercise on the Campus Martius, and in the height of this, plunge into the Tiber without any ill consequences — indeed they found high enjoyment in it, and thought it conducive to health. A still more surprising example is afforded by the Russians, with whom it is a practice after remaining some time in a bath of 106 to 116° F., immediately to roll naked in the snow, and again return to their baths, and receive no injury

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from such strange practices. Formerly a practice prevailed among the Indians of this Country, and perhaps now does with some, for certain diseases to get into a profuse perspiration by some means, and run and plunge forthwith into a neighbouring stream of water. Currie endeavours to explain these instances by contending that the preternatural heat is not in a declining state, or in other words, that profuse perspiration and sweat have not diminished it. How far this explanation be correct, I shall not attempt to decide; but I suspect habit has as much influence in the case as any thing else in preventing its effects.—

Having given the previous preliminary remarks, I am next to commence on the description of the disease; and first of the Symptoms. These I have already partly anticipated in the cases before mentioned. As there are evidently two differ-

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terminates in death in four or five minutes? In other cases, the patient appears convulsed; frequently, however, the symptoms are not so hopeless, there being only slight spasms in the breast and stomach, which gradually wear off: they may be sometimes sufficiently violent to produce death. Again it may, without producing very sensible effects when first taken, frequently be the exciting cause of dysentery or diarrhœa. — If the case be a violent one, and the patient sustains the first attack, reaction follows, a fever is induced, and the disease locates itself in some particular part of the system — the symptoms now presenting themselves belong to the second stage of the disease. — This much being said of the symptoms, I shall next consider the pathology. Here it becomes my duty to speak of the operation of cold. Were I to enter minutely into it, I should have to encounter much difficulty

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from the great diversity of opinion respecting its operation, whether a sedative or a stimulant? Therefore to avoid all controversy, I shall pass over in silence the various arguments which each party have brought forward in support of their theories, and simply state my belief in its directly depressing or sedative effects in these cases.
But little is to be derived from the contributions of our predecessors to conduct us to the elucidation of its pathology — indeed, it has scarcely ever been attempted to be explained fully; I, therefore, commence with the utmost diffidence, sensible of my incapacity, and aware of the labyrinth in which all hypotheses are involved.—
From my views of the sedative operation of cold water, I am led to conclude that when a large draught of it is suddenly taken into the stomach, previously highly excited by the influence of heat, depression of that organ ensues — this through

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the medium of the par vagum is transmitted to the sensorium commune - the nerves of respiration are affected, and decarbonization of the blood is not sufficiently carried on - the heart and arteries partake of the depression, and the blood is propelled with less force - the circulation of the capillaries both internal and external diminishes - the secretions previously highly excited are arrested, and thus congestion of the large venous trunks takes place; and if the system does not speedily begin to react, the circulation ceases entirely, and death is the result. Should, however, the effects be not so powerful, and the system again react, it does it so powerfully, from the accumulation of excitability, in attempting to restore the suspended secretions, that it stops not at the healthy standard, but continues till it produces excess of action, and consequently disease. The inflammation attendant on this

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recipive action, the cause of fever, now attacks some one organ which may be predisposed or in a situation to take on disease. —

If the external application of cold water cannot be explained to operate in like manner, perhaps it may by the principles inculcated by the ingenious Darwin — viz — the first impression is on the cutaneous capillaries, which cease to act from the defect of irritation caused by the defect of the stimulus of heat; and secondly, the internal capillaries cease to act from the defect of aeration; which is caused by the defect of the motions of the cutaneous capillaries. Thus congestion takes place in the internal parts in part from the defect of irritation, and partly from the defect of aeration. —

Sufficient, I hope, has now been given of its pathology to guide us to more correct principles in the practice which is to be pursued.

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The treatment of the disease will depend very much on the time at which we see the patient. Arriving at the onset of the disease, our first indication should be to attempt to restore the vital energies of the system; to accomplish which, we must resort to powerful stimuli freely exhibited. Laudanum, I believe, is almost universally preferred either alone or in combination with some other stimulants; To attain its beneficial effects it should be given in large and repeated doses; for an adult from ℥ss. to ℥ij. or more best given in warm brandy toddy. The laudanum seems to promise much from its highly stimulant properties; from relaxing spasm if any exist; and also from alleviating pain. Other preparations of opium might be substituted for laudanum. Ether also is an important medicine in this disease.

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its greatest objection is its tendency to evaporate and produce cold – this is best overcome by administering it in the form of syrup in doses of ℥ss or more. Any or all of the diffusible stimulants may be resorted to, such as the volatile alkali, camphor, spts. turpentine, &c. The warm stimulating aromatic teas, as ginger tea, ought to be given. A bladder of water heated to 110 or 115° ℉ should be placed over the stomach – this is spoken of in the most flattering terms by Cousin. Friections of warm sand or something of the kind may be freely used over the whole surface of the body – they would aid very much in restoring the circulation of the capillaries. Sinapisms to the extremities to produce a counter-irritation, and consequently a revulsion of blood from the internal parts to the external surface and extremities. The warm bath

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I suspect would be of very great utility.
No crowd should hover over the patient - all ligatures should be removed, and the patient placed in a cool airy situation. When the powers of life appear to be suddenly suspended, the same remedies should be used as in cases of asphyxia - volatilis, friections, warmth, and stimulants. - I have now given the treatment which I deem best adapted to the first stage of a violent case of the disease. It differs in some respects from that practised by some physicians - I allude to those who resort to blood-letting indiscriminately in every case. This latter practice in my opinion must be very injudicious when used as above, for very frequently the constitution of the patients has been previously injured or worn out in the abuse of spirituous liquors. Such constitutions, suffer-

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ing under so great prostration of strength, would sink under the evacuation of free venesection so much as never to be able to react again. When the patient is of a good constitution, and nothing forbid, we may attempt to draw blood, watching strictly the effect it has on the system, and regulate it accordingly. I have no doubt, when used under such circumstances, but it is oftentimes calculated to be of much futility – it equalizes the circulation; removes congestion; facilitates reaction, and moderates its subsequent violent effects. — If the remedies I have already mentioned prevent the patient from being carried off in the first stage, reaction now commences – at this time we should bleed in almost every case for the purposes of obtaining its good effects above described – the quantity regulated by circumstances.

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After reaction is fully established, as also willing to venesection much advantage may be derived from an emetic. It evacuates the contents of the stomach, equalizes the excitement of the system; determines to the surface; and in its pervading operation, tends very much to reinstate the arrested secretions. — If inflammation of any part now ensues in despite of what has been recommended, it will demand the same treatment as when arising from any other cause — blood-letting, cathartics, blisters, low diet, &c. In a word treat the symptoms as they present themselves.

The description of the disease being finished, I might now says a few words as regards its prophylaxis; nothing need, however, be insisted on, but extreme caution in not taking ice very cold, and not to drink too much at the time which should be held in the mouth

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submit it, imperfect as it is, to your perusal, con-
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Inaugural Essay

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